Math: Fifth Grade

Estimating Distances

Objectives

Students will be able to:
• Estimate distances between two points.
• Read and interpret maps with a better understanding.
• Locate various places in the world.

Warm-Up

About how far is it from your town to the capital of your state?

WolframAlpha computational knowledge engine

Boston to Cambridge MA

Assuming Boston (Massachusetts, USA) | Use Boston (New York, USA) or more instead

Input interpretation:

Boston, Massachusetts to Cambridge, Massachusetts

Distance: Show metric units

3.763 miles

Direct travel times: More

aircraft (550 mph)	25 seconds
sound	20 seconds
light in fiber	30 μs (microseconds)
light in vacuum	20 μs (microseconds)

(assuming direct great-circle paths)

Map:

Lesson

Student exploration: Students will be able to explore the approximate distances between two places using a map. They will then check their estimates and do extra exploration with Wolfram|Alpha.

Sample questions:
• Estimate the distance between New York and Seattle.

WolframAlpha computational knowledge engine

New York to Seattle

Assuming "New York" is a city | Use as a US state instead

Input interpretation:

New York to Seattle, Washington

Distance: Show metric units

2412 miles

Direct travel times: More

aircraft (550 mph)	4 hours 20 minutes
sound	3 hours 10 minutes
light in fiber	18.1 ms (milliseconds)
light in vacuum	13 ms (milliseconds)

(assuming direct great–circle paths)

Map:

- Estimate the distance between Boston and Tampa.
- Estimate the distance between the Statue of Liberty and the White House.

WolframAlpha™ computational... knowledge engine

Statue of Liberty to White House

Assuming "White House" is a building | Use as a park or a city instead

Assuming "Statue of Liberty" is a park | Use as a building instead

Input interpretation:

Statue Of Liberty National Monument to The White House (building)

Distance: Show metric units

201.6 miles

Direct travel times: More

aircraft (550 mph)	22 minutes
sound	16 minutes
light in fiber	1.52 ms (milliseconds)
light in vacuum	1.08 ms (milliseconds)

(assuming direct great–circle paths)

Map:

Computed by: Wolfram Mathematica Source information » Download as: PDF | Live Mathematica

- Choose a place in Europe and a place in Australia and find the distance between them in W|A.
- Find the approximate distance between the Eiffel Tower and the Golden Gate Bridge.

WolframAlpha™ computational… knowledge engine

Eiffel Tower to Golden Gate Bridge

Input interpretation:

Tour Eiffel (building) to Golden Gate Bridge

Distance: Show metric units

5575 miles

Direct travel times: More

aircraft (550 mph)	10 hours 8 minutes
sound	7 hours 20 minutes
light in fiber	41.9 ms (milliseconds)
light in vacuum	29.9 ms (milliseconds)

(assuming direct great-circle paths)

Map:

Fraction of Earth circumference:

$0.22 \approx 1/5$

Computed by: Wolfram *Mathematica* Source information » Download as: PDF | Live *Mathematica*

• Have students choose two places that they would like to visit and estimate the distance between them. How long will it take to get from one place to the other?

Wrap up with a brief discussion of their findings.

Closing

Have each student estimate the distance from your classroom to the cafeteria (or other place in the school). Calculate the actual distance. The closest estimate wins.

Demonstrations

US City Tours